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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/882,141	06/15/2001	Yiqiong Wang	AM1562D1	8856

32588 7590 02/25/2003

APPLIED MATERIALS, INC.  
2881 SCOTT BLVD. M/S 2061  
SANTA CLARA, CA 95050

EXAMINER

UMEZ ERONINI, LYNETTE T

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 02/25/2003

13

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/882,141

Applicant(s)

WANG ET AL.4

Examiner

Lynette T. Umez-Eronini

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 4 is/are allowed.
- 6) ☒ Claim(s) 1-3 is/are rejected.
- 7) ☒ Claim(s) 5 and 6 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 5 and 6 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend from any other multiple dependent claim 3. See MPEP § 608.01(n). Accordingly, these claims have not been further treated on the merits.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, lines 3-4, "consisting of one or more of a fluorine-containing gas selected from the group consisting of SF<sub>6</sub>, Si<sub>2</sub>F<sub>6</sub> and SiF<sub>4</sub>, HBr and oxygen" is indefinite because of improper use of Markush language. Assuming that commas separate members of the Markush group, then such assumption gives HBr and O<sub>2</sub>, which fails to meet the claim limitation.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komura (US 5,423,941) in view of Harshbarger et al (US 4,208,241).

In claim 1, lines 1-2, "for a silicon substrate connected to a low power bias source" is not given patentable weight because the claim recites functional language which tells intended use of rather than describe the invention.

Komura teaches etching a silicon semiconductor substrate with an etchant gas mixture comprising HBr, SiF<sub>4</sub>, He, O<sub>2</sub>, and SF<sub>6</sub> (Figure 1A; column 4 line 23-27; column 6, lines 49-52, 63-66; Tables 1, 2, 3, and 6; Figure 3; and column 4, lines 8-24).

Komura differs only in failing to teach an anisotropic etch mixture, **in claim 1**.

Harshbarger teaches anisotropic etching refers to etching resulting in an essentially flat, vertical etch wall on a plane approximately that of the initial resist edge prior to etching (column 4, lines 49-57), which is similar to Komura's trench in Fig 1A.

Komura's etchant mixture provides a trench with a good configuration preserving a slight taper of trench sidewall at an angle near 90° (column 2, lines 30-34, 52-57; Tables 1, 2 and 6; and Figure 1A). Since Komura's etchant mixture etches silicon to form a structure which has characteristics of an anisotropic etch as taught by

Art Unit: 1765

Harshbarger, then it is the examiner's position that one having ordinary skill in the art at the time of the claimed invention would have found that using Komura's etchant mixture would result in an anisotropic etch mixture consisting of at least one of the fluorine-containing gases selected from the group consisting of  $\text{SF}_6$ ,  $\text{Si}_2\text{F}_6$ , and  $\text{SiF}_4$ ; HBr and oxygen, as the claimed invention for the purpose of forming a trench having a good configuration.

***Allowable Subject Matter***

8. Claim 4 is allowed. The following is a statement of reasons for the indication of allowable subject matter: Prior art fails to teach an etch mixture consisting essentially of a fluorine-containing gas that includes  $\text{Si}_2\text{F}_6$  along with  $\text{SF}_6$  and  $\text{SiF}_4$ ; and HBr and oxygen.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is 703-306-9074. The examiner can normally be reached on the First Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech can be reached on 703-308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

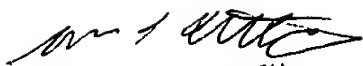
Application/Control Number: 09/882,141

Page 5

Art Unit: 1765

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February 24, 2003

  
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SUPERVISORY PATENT EXAMINER  
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